DOCUMENT RESUME

ED 098 998 IR 001 391

AUTHOR Rushton, John B.
TITLE Business Statistics 1--An Audio-Tutorial Venture: Course Organization, Sample Study Guide, and Grade Contract.
PUB DATE Nov 74
NOTE 9p.; Paper presented at the Annual Meeting of the Audio-Tutorial Congress (6th, San Francisco, California, November 1974)

EDRS PRICE MF-$0.75 HC-$1.50 PLUS POSTAGE
DESCRIPTORS Business; *Business Administration; College Instruction; *Course Descriptions; Curriculum Development; *Individualized Instruction; Multimedia Instruction; *Statistics
IDENTIFIERS *Audio Tutorial Instruction; Business Statistics; Metro State College; Personalized System of Instruction

ABSTRACT

A business statistics course based on audiotutorial instructional resources is described. The course, taught at Metro State College in Denver, Colorado, consisted of 13 modules which a student normally could complete in seven weeks or less. A feature of the course was a set of incentives to prevent students from procrastinating their completion of the modules: the students who were up-to-date in their work were not required to take a midterm or final exam. Included in the paper is a sample study guide used for 1 of the 13 modules together with the student grade contract form used by each student to set his/her course performance objectives. (DC)

BEST COPY AVAILABLE

ED 098998

BUSINESS STATISTICS I--
AN AUDIO-TUTORIAL VENTURE:

COURSE ORGANIZATION, SAMPLE STUDY GUIDE, AND GRADE CONTRACT

Presented to
The Sixth Annual Audio-Tutorial
Congress Conference
San Francisco, California
November 6-8, 1974

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY.

John B. Rushton
School of Business
Metropolitan State College, Denver

IR 001 391

BEST COPY AVAILABLE

BUSINESS STATISTICS I--
AN AUDIO-TUTORIAL VENTURE

ABSTRACT

The area of Business Statistics is a field with great potential for Audio-Tutorial enrichment. Every School of Business in the USA requires at least one quarter of Statistics, and frequently more than three quarters. Yet there are, at this writing, no known offerings using Audio-Tutorial methods or Personalized System of Instruction.

This paper presents the Course Organization for a proved-successful Business Statistics I course taught by the Audio-Tutorial method of Personalized System of Instruction. The course organization and policies includes an incentive plan with clout: it effectively arrests procrastination on the part of students - which has been a persistent problem in Self-Paced courses. In addition to more mundane matters, the Organization also presents complete grading guidelines with unique innovations.

A sample Study Guide is offered, showing how one module is structured. This provides the reader with proven procedures and techniques for specifically handling course objectives, not only through slides and tapes but printed supplements.

In addition, a detailed Grade Contract is presented which allows the student to contract for the maximum receivable grade (A, B or C) and/or revise the contract downward if he feels he is devoting excessive time to the course.

In short, this paper will prove to be of real worth to all those trying to get a Self-Paced Business Statistic course started. It contains real meat.

INTRODUCTION

As the reader knows, development of any Personalized System of Instruction course requires considerable resources, not the least of which is time. This is especially true if the PSI course is to have an Audio-Tutorial thrust. Our Business Statistics I is designed to make extensive use of tapes and slides developed at Metropolitan State College. The administration responded favorably to our proposal for course-development funds [1], which enabled us to work freely at improving the method by which the course material would be taught.

After considerable investigation, the text chosen was Statistical Analysis for Business and Economics, Second Edition, by Leonard J. Kazmier, (McGraw-Hill, 1973). It is a programmed textbook, and lends itself to self-study and self-pacing.

BEST COPY AVAILABLE

The course is divided into thirteen modules. Each module is accompanied by a printed Study Guide, which serves as a guideline to the student. Although the essentials of course content may be found in the text and Study Guides, the course is designed so that primary learning experiences occur with the tapes and slides, whenever the student so elects.

In every aspect, we have attempted to personalize the presentation of the material. Techniques learned from experience with a variety of teaching innovations, for example, the Seating Chart Quiz [2], are employed. We try any device if it gets the student to think through a valid problem-solving procedure for himself. We make extensive use of proctors, and it is recommended that the proctor-to-student ratio be held to no more than 7:1. Otherwise jam-ups occur in grading the readiness tests, and there never seems to be a proctor available to help students. The resulting deterioriation in morale is short of tenable.

Follow now the three documents from the course. They are presented for the reader's free application, inspection, dissection and enlightenment. The author welcomes comment and evaluation.

COURSE ORGANIZATION & POLICIES

CMS 231 Business Statistics I--
Self-Paced Audio-Tutorial

This course in Fundamentals of Business Statistics will be offered by a Self-Paced Audio-Tutorial Method in Personalized System of Instruction. PSI involves teaching of courses as if each student were a class of one.

The course is divided into 13 modules to be studied and mastered in numerical order. No lectures are given over the material. Instead, each module is accompanied by a printed study guide, which serves as a guide and supplement to the programmed textbook and tape-and-slide presentations.

The class will meet at the scheduled times, when the instructor and student proctors will be there to answer questions and help you with concepts. You will be assigned a specific proctor who will normally read your Readiness Tests. Attendance is optional, but highly recommended.

The course is self-paced. You may work through the units at your own pace, at the rate, time and place that you prefer. You may use the slides and tapes any time the room is open. When you feel you have mastered the material in a given module, ask for the Readiness

BEST COPY AVAILABLE

Test. If you perform at the appropriate level, you may move to the next module. If your Readiness Test indicates you need more study on the material, your proctor will recommend additional work. You may take as many Readiness Tests as are required to master the material without incurring a penalty. You may not, however, take more than one version of a Readiness Test on the same day within any one hour-and-a-half period.

Module VIII is, in essence, a Midterm Exam; and Module XIII is a comprehensive Final Exam. A serious problem in PSI courses, traditionally, has been procrastination. To help prevent you from falling into this pitfall, consider the following incentive plan:

INCENTIVE: (1) If you have completed the first seven modules by the end of the fourth week (12th contact hour), you will receive automatic credit for Module VIII (no "Midterm" Readiness Test required).

(2) If you have completed the first twelve modules by the end of the seventh week (21st contact hour), you will receive automatic credit for Module XIII (no Final Exam required).

You will note this is real incentive. So get with it and you can get this course behind you without "true" examinations!

Grades: A unique feature of this course is your right to contract and receive one of three grades: A, B, or C. The lower the contracted grade, the less work, theoretically, required of you to move successfully through the course. The higher the contracted grade, the closer to complete mastery of the material you will achieve.

You should try for the A at the beginning for several reasons: (1) you can achieve it, (2) an A will make you feel good, (3) an A will make me feel good, (4) if you find you need to devote time and effort elsewhere you can revise the contract downward, and (5) you cannot revise your contract upward without re-commencing the course. So, try for the A.

The course grading scale is as follows:

90%	A
80%	B
70%	C
60%	D

Your final grade will be determined by two factors, generally:

1. The contract.
2. Performance on Final Examination. To receive the contracted grade, you must earn at least one grade below your contracted grade.

BEST COPY AVAILABLE

Possible combinations of contracts, and Final Exam Scores and Final course grades are:

Contract	Score on Final	Final Course Grade
A	≥ 80	A
	70-79	B
	60-69	C
	< 60	D
B	≥ 70	B
	60-69	C
	< 60	D
C	≥ 60	C
	< 60	D

Students who do not complete the course during the current quarter will be awarded grade of "SP", and may enter during subsequent quarters at the point previously achieved. You may alternatively elect to enroll in a regular CMS 231 section. Either case requires that you officially re-enroll and pay usual fees.

The Kazmier text is required: each student will need it at each meeting.

Do make extensive use of the tapes and slides. They are designed to ease assimilation of the course content.

GRADE CONTRACT

CONTRACT FOR GRADE
in
CMS 231 (Self-Paced Audio-Tutorial)

Date_____ Name (printed)_____
Last name first

On this day, an agreement has been entered into between the above-named student, Social Security Number _____, and Professor Rushton, whereby the above-named student shall receive a maximum grade of _____ for Business 231-3, Business Statistics I--Self-Paced Audio-Tutorial.

This means that the student may advance from one module to another only after the student has met the performance standards for the grade level agreed upon.

BEST COPY AVAILABLE

Note to student: We want you to earn an "A" in this course. It can be done without getting a mental hernia. And YOU can do it. To encourage you to try for the "A", at least for a few modules, we have established the rule that your contracted grade cannot be revised upward, only downward.

We consider you an adult, however, and if at any time during the course you believe A-level performance is exacting too much of your time and effort, you may elect to revise your contract downward. No stigma is attached to this: you simply decide you will do less work and get less "pay." You will still master the course content satisfactorily.

Revisions to this contracted grade may be made downward (see below), but cannot be made upward without re-commencing the course.

The final grade for the course will be influenced by the student's performance on the instructor's Final Examination (see course Organization and Policies), but will not exceed the contracted grade.

Student's Signature_____

Instructor's Signature_____

REVISIONS

The above contracted grade of _____ is hereby revised to a _____.
Student _____
Date _____
Instructor _____
Date _____

The above revised grade of _____ is hereby revised to a _____.
Student _____
Date _____
Instructor _____
Date _____

A SAMPLE STUDY GUIDE

Module XI

POINT ESTIMATION

Module XI is fairly easy, and introduces you to estimation via the point estimate. This is a necessary precursor to understanding interval estimation, which we shall consider in the next module.

Keep in mind, for this course the only sampling distribution we will consider is that of the arithmetic mean. It is the distribution of all possible sample arithmetic means of a certain sample size.

BEST COPY AVAILABLE

Objectives:

As a result of your work in Module XI, you should be able to:

1. Distinguish between point estimation and interval estimation.
2. Compute a point estimate of a parameter.

Procedure:

1. Read Kazmier, pp. 200-205.
2. Do Frames 1-4, 17-18, 20-23, and review frames 98, 99, & 103.
3. Read Discussion below.
4. Do Pink Sheet problems (on steel wire breaking points), but save confidence interval until Module XII.
5. View and listen to slides and tapes.
6. Ask for readiness test for Module XI.

Discussion:

Consider Frames 81 and 82, page 190. You recall we are given a continuous process producing steel wire with mean breaking strength, μ, of 300 pounds, and standard deviation, σ, of 15 pounds.

We need now to take up an important type of problem, illustrated by the following:

What is the probability that a sample of 25 wires, taken from the above population, will have a mean breaking strength of less than 297 pounds?

1. First, summarize the problem into convenient notation form:

$$P\left(\bar{X}_{n=25} < 297 \,\middle|\, \begin{matrix}\mu = 300 \\ \sigma = 15\end{matrix}\right)$$

This may be read "probability that the mean of a sample (of size 25) will be less than 297, given that the sample came from a population whose μ is 300, and whose standard deviation is 15."

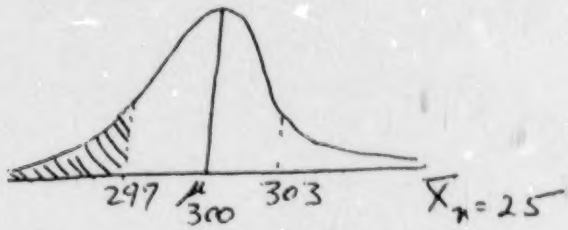
2. Next we need to consider the distribution of all possible arithmetic means of samples of size 25 taken from the above population. What do we know about such a sampling distribution? We know, from the central limit theorem--
    1. The distribution is normal, i.e., bell-shaped.
    2. The mean of the distribution is μ, i.e., 300 pounds.
    3. The standard deviation of the distribution is the standard error, which may be computed thusly:

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{15}{\sqrt{25}} = 3 \text{ pounds}$$

BEST COPY AVAILABLE

3. We now have a plain old Normal Curve problem similar to those from Module VII! Remember every Normal Curve is completely defined by the mean and standard deviation of its distribution.

   Make a sketch, shading in the area needed for the answer:



   In the above sketch, why is the standard deviation NOT 15 pounds? _____

   (This is a very important point, so you might want to clear your answer with a proctor, or check the concept starting with slide XI-10.)

4. Figure pertinent z values:

$$z_{297} = \frac{\bar{X} - \mu}{\sigma_{\bar{X}}} = \frac{297 - 300}{3} = -1$$

5. Look up associated areas, and manipulate to reach the answer:

Area less than μ	=	.5000
−Area $-1\sigma_{\bar{X}}$ to μ	=	−.3413
Area less than 297		.1587

6. So, we conclude that the probability of drawing a sample of 25 wires, from the above process, with mean breaking strength of less than 297 pounds is only .1587, or 15.87%.

SUMMARY

Business Statistics I-- Self-Paced Audio-Tutorial has enjoyed considerable success.

This paper presented a short over-view, along with three specimen documents from the course: Course Organization and Policies, Grade Contract, and a Sample Study Guide. These instruments, proved in the classroom, will be of real help to anyone in the process of developing a Self-Paced Audio-Tutorial course in Business Statistics.

BEST COPY AVAILABLE

REFERENCES

[1] Rushton, John B., "Formulating the Successful Proposal for PSI Course-Development Funds: Guidelines, Comments and Specimen Pro Forma for Business Statistics," Proceedings of the National Conference on Personalized Instruction in Higher Education, 1974, the Center for Personalized Instruction, Georgetown University, Washington, D. C.

[2] Rushton, John B., "The Seating Chart Quiz," Proceedings of the Fifth Annual Meeting of the American Institute for Decision Sciences, (October, 1973), pp. 90-92.